Lab 3

First Stage

Cyber Security Science Department

Computer Organization and Logic Design

Lab 3: NOT &NOR Gates

By

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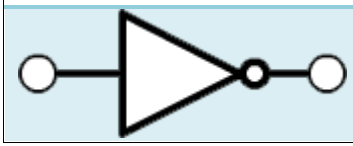
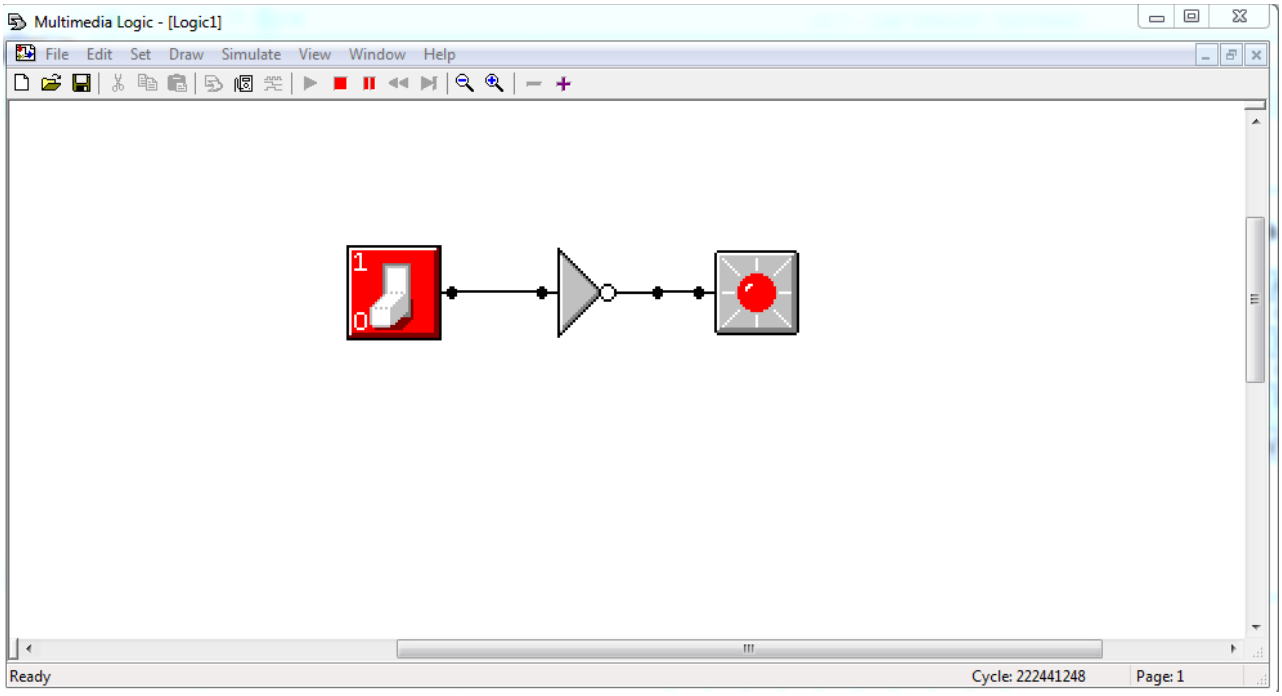
NOT & NOR Gates

1. NOT (Inverter) Gate

A NOT gate, often called an inverter, is a nice digital logic gate to start with because it has only a single input with simple behavior. A NOT gate performs logical negation on its input. In other words, if the input is true, then the output will be false. Similarly, a false input results in a true output.

Symbol	Truth table for a NOT gate	
	**Input**	**Output**
	false	true
	true	false

1.1 Implementation



Truth table of experiment

Switch	LED
0	Lit / 1
1	Dark / 0

The most basic gate. It changes its input from a "1" to a "0", and vise versa.

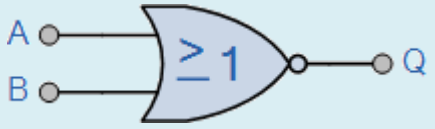
2. Universal Logic Gates

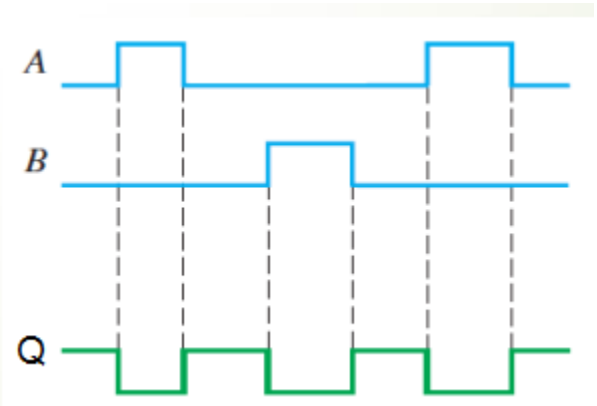
2.1 NOR Gate

The NOR gate, is a useful logic element because it can also be used as a universal gate; that is,
NOR gates can be used in combination to perform the AND, OR, and inverter operations.

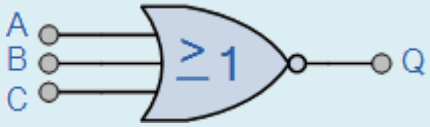
- The NOR gate is equivalent to an OR gate followed by NOT gate
- Boolean Expression : Q = A + B

2-input NOR Gate

Symbol	Truth Table		
	B	A	Q
	0	0	1
	0	1	0
	1	0	0
	1	1	0
2-input NOR Gate			
Boolean Expression Q = A+B	Read as A **OR** B gives **NOT** Q		



3-input NOR Gate

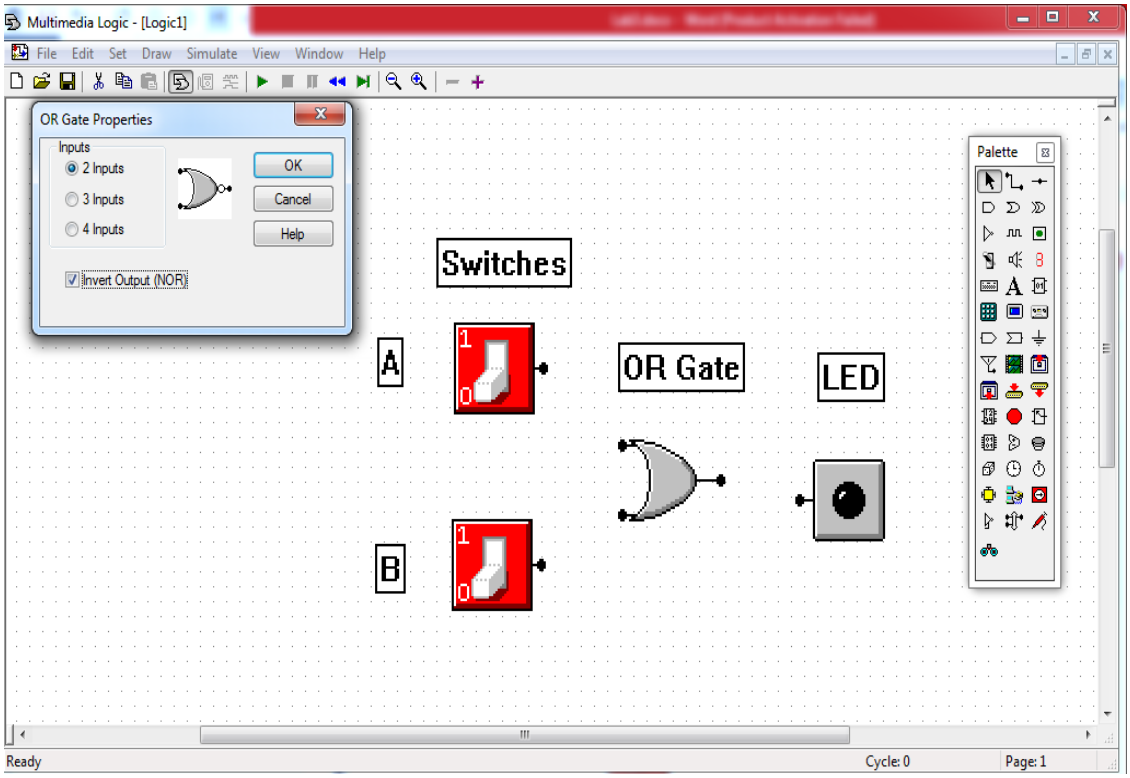
Symbol	Truth Table			
 3-input NOR Gate	C	B	A	Q
	0	0	0	1
	0	0	1	0
	0	1	0	0
	0	1	1	0
	1	0	0	0
	1	0	1	0
	1	1	0	0
	1	1	1	0
Boolean Expression Q = A+B+C	Read as A OR B OR C gives NOT Q			

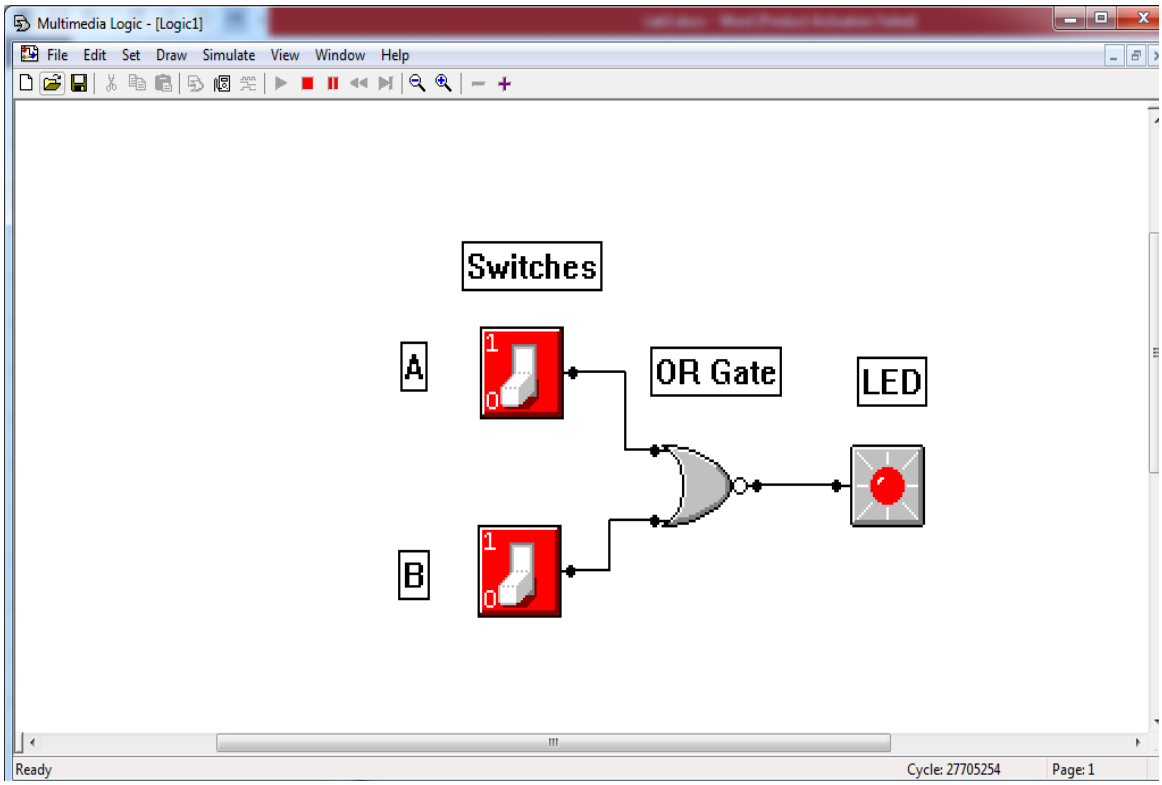
2.1.1 Implementation

Implement the NOR Gate using two-way

1- Connect OR gate with check Invert output(NOR)

If 2- input, duple click on OR gate to choose 2-input and check Invert output (NOR)

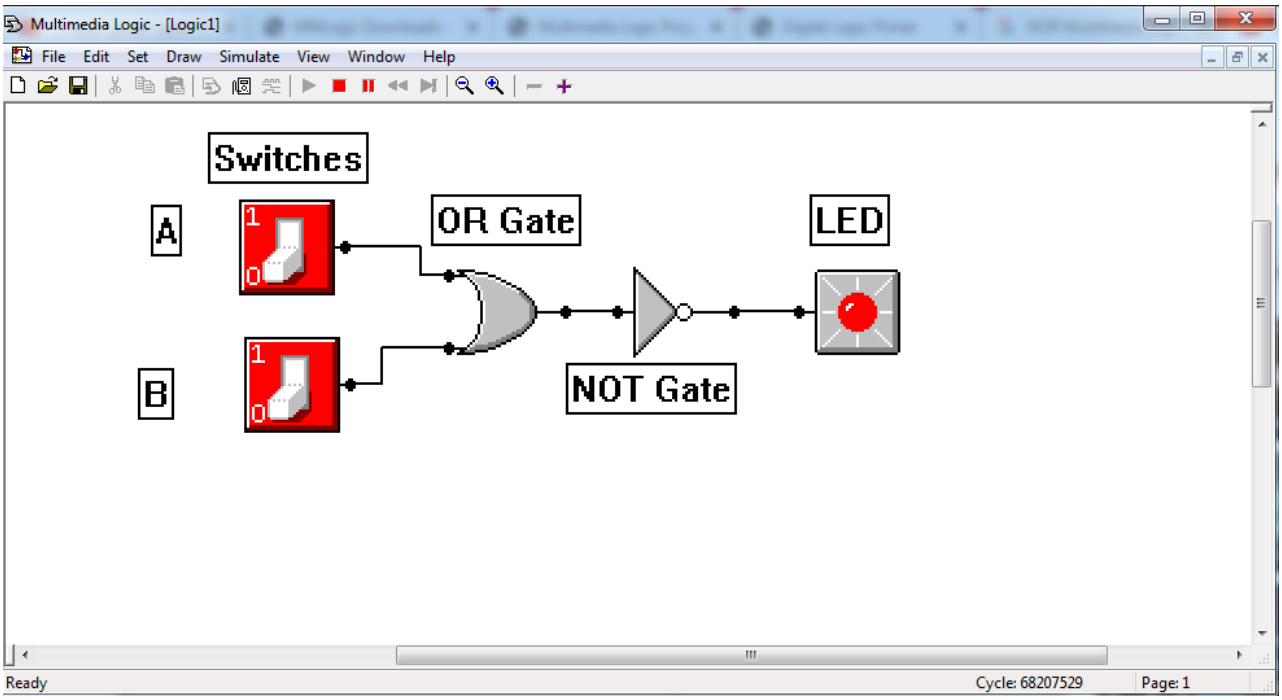




Nor is short for **Negative Or**. This gate combines an **Or Gate** with its output connected through an **Inverter Gate** in one device. It will output a **"0"** if **either** its inputs are a **"1"**

Switches		LED
0	0	Lit / 1
0	1	Dark / 0
1	0	Dark / 0
1	1	Dark / 0

3. Connect OR + NOT



3- input

Duple click on OR gate to choose 3-input and check Invert output(NOR)